

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of

Applicant : Schaefer et al.  
Serial No. : 09/996,244  
Filed : November 28, 2001  
Title : TRAPPING AND STORAGE OF FREE THERMAL NEUTRONS IN  
FULLERENE MOLECULES  
Docket : 594826-001C1  
Tech. Center : 3600  
Art Unit : 3641  
Examiner : Behrend, Harvey E.

MAIL STOP APPEAL BRIEF-PATENTS

Commissioner for Patents

P.O. Box 1450

Alexandria VA 22313-1450

Sir:

REPLY BRIEF

This Reply Brief is specifically filed with respect to the rejection under 35 U.S.C. § 112, first paragraph as set forth in Section 9(a) of the Examiner's Answer.

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(1) Status of Claims

The status of the claims has not changed and is as indicated in the Appeal Brief.

(2) Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection have not changed and remain as set forth in the Appeal Brief.

(3) Argument

I. Rejection Under 35 U.S.C. § 112 Second Paragraph as Being Indefinite

While the Examiner's Answer is twenty-two pages long, the facts that satisfy the enablement requirement are easily stated:

(1) The fullerenes of the present invention are prepared by placing the fullerene in a neutron flux of a nuclear reactor as described in the application. The efficacy of this process is attested to by Dr. Talnagi in his second affidavit.

(2) The production of a fullerene containing a trapped thermal neutron is verified by an analytical procedure known as data stripping wherein fullerenes devoid of constituents capable of producing a beta decay having a half life approximating that of a thermal neutron are used to prepare the claimed fullerene and a gamma analysis of the product is conducted to verify the presence of the trapped thermal neutrons.

The Federal Circuit reversed the Board of Patent Appeals holding of lack of enablement in *In re Wands* where the invention required screening hybridomas to determine which ones secreted a desired antibody. 858 F.2d 731, 737-740 (Fed. Cir. 1998). The Federal Circuit held that a person of skill in that art was capable of screening hybridomas to find the one desired. *Id.* at 740. Similarly, here a person skilled in nuclear science would be capable of analyzing the gamma emissions of the applicants' product to confirm the presence of the thermal neutron. Such a person of skill in the art, which is a high level of skill, would know: (1) to set up a controlled experiment to avoid scientific errors from contaminants and (2) to analyze results to look for a gamma emission indicative of a thermal neutron.

There is a difference between enabling a person skilled in the art to make and use the claimed fullerenes and verifying that the invention works. Verifying that the invention works requires starting materials of a quality that permits the thermal neutron to be detected. However, starting materials of this purity are not required to "make and use the invention" once it has been demonstrated by data stripping that placing the fullerene in a neutron flux yields the claimed

fullerene containing the trapped thermal neutron. For example, if applicants claimed a new chemical compound, in order for IR absorption spectroscopy to verify the structure of that compound, a pure product, might be required. But, once the structure of the compound has been verified, the presence of such contaminants does not take away from the fact that the claimed entity is present. A person skilled in the art can make the claimed compound by using the appropriate synthetic procedure and can verify the compound by IR testing of a contaminant-free sample. Similarly, in this case, a person skilled in the art can make the claimed fullerene using a neutron flux and verify the presence of that claimed fullerene by using an appropriate starting material.

With this background, the applicants respond to the arguments raised in the Examiner's Answer as follows:

The Examiner states at page 13, first paragraph, that "appellants have to show that alternative explanations are not valid and the only possible explanation for their observation is due to the trapped neutron." The applicants know of no case law that requires them to establish that "the only possible explanation" for their observation is due to the trapped neutron. Nevertheless, the applicants have described in the application and a person skilled in nuclear science would understand how the selection of a starting material and data stripping would be used to verify the presence of a fullerene containing a trapped thermal neutron. Thus, the application meets the enablement requirement.

At page 15 of the Answer, the Examiner asserts that an undisclosed fullerene is required to make and use the invention. The applicants disagree. The invention can be obtained using the fullerene that is disclosed in the application, as well as other fullerenes. Proof that the irradiated fullerene contains a trapped thermal neutron is enabled if the starting material is devoid of contaminants that would prevent detection of the thermal neutron. This would be readily apparent to a person of ordinary skill in the art. Thus, a person of ordinary skill in the art desiring to not only make but also to verify the production of a fullerene containing a trapped thermal neutron would select a starting material that did not contain contaminants that, upon

being subjected to a neutron flux, yield nuclear decays that would hide the decay that is characteristic of the thermal neutron.

The applicants theorize that they are able to trap a thermal neutron because in any neutron flux there will be a population of neutrons having an energy level that is sufficient to penetrate the electron cloud of the fullerene one time but not sufficient to penetrate the electron cloud of the fullerene twice so as to escape the fullerene. This is a rationale for the invention, and it is reasonable. Contrary to the Examiner's argument, § 112 does not require the applicants to claim specifically the theory. Their invention is the claimed fullerene regardless of electron clouds.

The Examiner argues that the fullerene samples the applicants have most recently used to verify the production of a trapped thermal neutron are different than those originally disclosed. This is irrelevant. Contrary to the assertions in the Answer, it is not an admission that undisclosed materials are necessary to verify the production of the claimed product. While more recently available fullerenes facilitate verification of the trapped neutron, they are not required to make, use and verify the invention.

That the applicants have not addressed certain beta emitters as argued in the last sentence on page 18 of the Answer is also irrelevant. As applicants have explained, these emitters are not addressed because there is simply no reason that they would be expected to be in the fullerene sample.

Accordingly, the Applicant respectfully requests the Board of Patent Appeals and Interferences to reverse the rejections.

Respectfully submitted,

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